

71. (New) A method for treating atrial fibrillation in a patient comprising:
opening the heart of the patient; and
ablating at least one linear lesion in the heart tissue using an irrigation probe as recited in
claim 64.

72. (New) A method according to claim 71, wherein the loop has a diameter ranging from about 0.50 inch to about 1.5 inches.

(B9)
73. (New) A method according to claim 71, wherein the loop has a diameter ranging from about 0.75 inch to about 1.25 inches.

REMARKS

Claims 11, 12, 17, 18, 26, 27, 30 to 34 and 36 to 73 are pending. Applicants have amended claims 34 and 42 and added new claims 64 to 73. Attached hereto is a marked-up version of the changes made to the claims by the current amendment, which is captioned "Version with markings to show changes made." The new claims find full support in the original specification, claims and drawings. No new matter is presented. In view of the above amendments and remarks that follow, Applicants respectfully request reconsideration and a timely indication of allowance.

As an initial matter, the Examiner states that claims 11, 12, 26, 27, 43 to 46, 52 to 55 and 57 to 60 are withdrawn from consideration as drawn to a non-elected species, there being no allowable generic or linking claim. In the Office action dated 10/25/02, the Examiner required election of a single species selected from the species of Figures 1 to 3, the species of Figures 4 to 6 and the species of Figures 7 and 8. In response, Applicant elected the species of Figures 4 to 6. First, claims 52 to 55 in fact cover the elected species, represented by Figures 4 to 6, and should be considered by the Examiner. Further, independent claim 42 covers species represented by Figures 4 to 6 and Figures 7 and 8. Thus, claim 42 is a generic or linking claim between the species of Figures 4 to 6 and the species of Figures 7 and 8. Therefore, Applicant respectfully requests that, once the species of claims 4 to 6 is found allowable, the Examiner continue to examine the scope of claim 42 and claims 43 to 46 that depend from claim 42.

Also, the Examiner objected to the drawings because they did not include reference numeral "52" as set forth on page 8 line 1. The specification has now been amended to delete reference to numeral 52.

The Examiner rejected claims 17, 18, 30 to 42, 47 to 51, 56 and 62 to 63 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Haissaguerre et al (US 6,068,629) in view of Swanson et al. (US 6,428,537). Applicant respectfully traverses this rejection.

Claims 34 and 42 have been amended to recite that both the first and second ends of the irrigation tube are fixedly attached to the distal end of the probe body. This limitation is taught neither by Haissaguerre nor by Swanson. Haissaguerre teaches a catheter for tissue mapping and ablation comprising two arms at the distal end, each arm carrying electrodes on its surface. The arms and the catheter form a generally Y-shape that allows the arms to provide increased and evenly distributed contact pressure across the entire length of an ablation location. (Col. 9, lines 15-32). Each arm comprises an outer sleeve 96 that defines an annular passage through which fluid flows from a fluid lumen in the catheter through holes in the arm. (Col. 9, lines 62-66; col. 10, lines 1-6). The Examiner seems to be suggesting each of these arms forms the claimed irrigation tube. However, Haissaguerre does not teach or suggest connecting the second (distal) ends of the arms to the catheter body, but instead describes the arms as each having a free end not connected to the catheter. Connecting the second (distal) ends of the arms to Haissaguerre's catheter would, in fact, undermine the ability of the arms to apply increased and evenly distributed pressure over the entire length of the arm, and thus would go against the teachings of Haissaguerre. Thus, nothing in Haissaguerre teaches or suggests that both the first and seconds ends of an irrigation tube are fixedly attached to the distal end of a probe body as presently claimed.

shown in 1st ref.

Swanson teaches catheters or probes and methods for treatment of atrial fibrillation in the heart, but does not make up for the deficiencies of Haissaguerre. Specifically, Swanson fails to even disclose an irrigation tube. Thus, nothing in Swanson teaches or suggests that both the first and seconds ends of an irrigation tube are fixedly attached to the distal end of a probe body. Accordingly, independent claims 34 and 42 are patentable over Haissaguerre and Swanson, and dependent claims 36 to 41 and 43 to 63 are similarly allowable over the two references.

Independent claim 64 has been added and recites that no other components extend through the inner cavity formed by the irrigation tube that is attached to the distal end of the probe body. This limitation is also not taught by Haissaguerre or Swanson. Haissaguerre teaches arm segments 34, 36 comprising a central mandrel core 94 attached at hinges 80,82, and outer sleeves 96 extending coaxially over the mandrel core. (Col. 9, lines 62-66). The core and outer sleeves define an annular fluid

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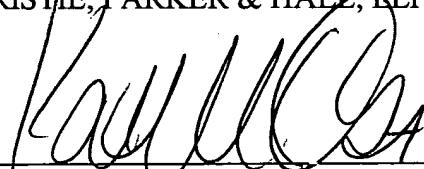
passage 98 therebetween. Haissaguerre does not teach or suggest attaching the arm segments 34, 36 to the distal end of the catheter body other than by a mandrel core. In addition to the core, individual insulated wires 90, 92 also extend through the annular fluid passage. (Fig. 12). These components are all important for Haissaguerre's catheter. Thus, nothing in Haissaguerre teaches or suggests that no other components extend through the inner cavity formed by the irrigation tube that is attached to the distal end of the probe body.

Swanson, as described above, fails to even disclose an irrigation tube. Thus, nothing in Swanson teaches or suggests that no other components extend through the inner cavity formed by the irrigation tube that is attached to the distal end of the probe body. Accordingly, independent claim 64 is patentable over Haissaguerre and Swanson, and dependent claims 65 to 73 are similarly allowable over the two references.

In view of the foregoing amendments and remarks, Applicant respectfully submits that all of pending claims 11, 12, 17, 18, 26, 27, 30 to 34 and 36 to 73 are in condition for allowance, and a timely indication of allowance is respectfully requested. If there are any remaining issues that can be addressed by telephone, Applicant invites the Examiner to contact the undersigned at the number indicated below.

Respectfully submitted,

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KMO/OSB/edb



VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Please replace the paragraph beginning at page 7, line 24, with the following amended paragraph:

The irrigation probe comprises a metal ribbon electrode 47 at the distal end 48 of the non-conducting tube 40 comprising an exposed metallic ribbon 49 that is coiled around a loop of irrigation tubing 56, both of which are indirectly or directly fixedly attached to the distal end 48 of the non-conducting tube 40. As illustrated in FIG. 5, the probe's distal end 48 is generally solid, having a fluid passage 50, ~~[and first and second blind holes 52 and]~~ a first blind hole (not shown) and a second blind hole 54 that correspond in size and location to the three lumens 46, 42 and 44, respectively, in the non-conductive tubing 40. In the embodiment shown, the fluid passage 50 is in fluid communication with the inner cavity of the flexible irrigation tube 56, which extends from the distal end of the fluid carrying lumen 46 out of the probe's distal end 48. The irrigation tube 56 has a series of irrigation openings 57 for passage of a cooling fluid out through the spaces between the coils of the metallic ribbon 49, as described in more detail below. The irrigation openings 57 can take any suitable shape, such as rectangular or oval slots or round holes. In a preferred embodiment the irrigation tubing 56 has at least three irrigation openings 57. The irrigation openings 57 are preferably in the section of the irrigation tubing 56 corresponding to the section of the metal ribbon electrode 47 that is to be in contact with the tissue during an ablation procedure to enhance the cooling of the ablation site.

In the Claims:

Please amend claims 34 and 42 as follows:

34. (Amended) An irrigation probe comprising:

a generally rigid probe body having proximal and distal ends;

a generally flexible irrigation tube having first and second ends, the irrigation tube defining an inner cavity, wherein the irrigation tube generally forms a loop and ~~[at least one end is]~~ both the first and second ends are fixedly attached to the distal end of the probe body, the irrigation tube having at least one irrigation opening through which fluid can pass from the inner cavity to the outside of the irrigation tube;

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means for introducing fluid into the inner cavity of the irrigation tube; and an electrode comprising a flexible metal ribbon having first and second ends, wherein the metal ribbon is coiled around the irrigation tube to form coils, and wherein space is provided between the coils to allow fluid to pass from the irrigation tube to the outside of the electrode.

42. (Amended) An irrigation probe comprising:

a generally rigid probe body having proximal and distal ends;

a generally flexible irrigation tube having first and second ends, the irrigation tube defining an inner cavity, wherein the irrigation tube generally forms a loop and ~~[at least one end is]~~ both the first and second ends are fixedly attached to the distal end of the probe body, the irrigation tube having at least one irrigation opening through which fluid can pass from the inner cavity to the outside of the irrigation tube;

an electrode comprising a flexible metal ribbon having first and second ends, wherein the metal ribbon is coiled around the irrigation tube to form coils, and wherein space is provided between the coils to allow fluid to pass from the irrigation tube to the outside of the electrode;

a handle mounted to the proximal end of the probe body; and

an infusion tube having proximal and distal ends, wherein the distal end of the infusion tube is in fluid communication with the inner cavity.